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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,437	04/11/2006	Dirk Burdinski	GB03 0186 US1	1847
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EXAMINER				
BANH, DAVID H				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/575,437

Applicant(s)

BURDINSKI ET AL.

Examiner

DAVID BANH

Art Unit

2854

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 August 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/CD)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on August 12, 2010 have been fully considered but they are not persuasive. Applicant argues that the combination of Adams et al., Chemiavskaya et al. and Schueller et al. do not teach the method of claim 1, particularly because "There is nothing in Schueller et al. that suggests a surface of a 'substrate having higher affinity for the ink than the barrier layer'". Applicant further argues that "Schueller et al. cannot use 'a substrate having a higher affinity for the ink than the barrier layer' because such a surface will remove all of the ink". Examiner disagrees. First, the adsorbent material used in Schueller et al. to clean all ink off of the surface of the protrusion and therefore has higher affinity to the ink than the barrier layer. If the barrier layer had a higher affinity to ink, the adsorbent material would not be able to attract and pick up the ink from the surface of the protrusion of the stamp. Examiner does not see where Applicant has drawn the conclusion that a substrate having a higher affinity to ink that the barrier layer surface of the protrusion of the stamp would remove all of the ink from the entire stamp, including from sidewalls that are not provided with a barrier layer. The invention of Schueller et al. leaves ink absorbed into the stamp and merely removes ink on the surface of the stamp. Analogously, the method of Adams et al. teaches removing all of the ink on the surface of the stamp, but leaving ink in recesses between the protrusions of the stamp for edge transfer lithography. The argument that all of the ink would be removed from the entire stamp due to wiping with an adsorbent material is unfounded.

Applicant has underlined the additional passages "none of the ink remains on the contact surface of the protruding feature due to the surface of the first substrate having a higher affinity" and "the second substrate having a higher affinity for ink than the barrier layer", presumably to imply that the combination does not teach these features. Examiner disagrees. The limitation "none of the ink remains on the contact surface" is taught in Adams et al., paragraph 8, as was pointed out in the previous rejection. The limitation "the second substrate having a higher affinity for ink than the barrier layer" was demonstrated because the ink transfers from the stamp to the second substrate (seen in Fig. 1A). The affinity of the ink to the second substrate is greater than the affinity of the ink to the stamp in general, by definition, since the ink transferred. The barrier layer can only have a lower affinity to ink than the stamp as a whole.

In view of the above reasoning, the Examiner is not persuaded of any error in the rejections as set forth specifically below.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adams et al. (US PG Pub 2005/0120902) in view of Cherniavskaya et al. (Langmuir

2002, 18, 7029-7034, provided as NPL by Applicant) and Schueller et al. (US PG Pub 2003/0047535).

For claim 1: Adams et al. teaches a method for transferring an ink pattern **15** to the surface of a substrate **18** (see Fig. 1A and paragraph 25, the substrate is the silicon dioxide plate and the ink pattern is the set of dots seen in the final substrate element of Fig. 1A), the method comprising providing an elastomeric stamp **10** having a bulk surface **11** and at least one protruding feature **16** protruding from the bulk surface **11** (see Fig. 1A), the protruding feature **16** having a contact surface **14** and an edge **19** extending from the contact surface **14** extending from the bulk surface **11** (see Fig. 1A), supplying a solution of the ink and a solvent to the surface of the stamp (see Fig. 1A, and paragraph 8, "a solution of the molecular ink and a solvent is applied to the surface of the stamp structure"), removing the ink (paragraph 8, blow drying) wherein the blow drying causes removal of the solvent and removes all of the ink from the surface of the stamp (see paragraph 8, the dewetting of the solvent into the recess and subsequent blow drying removes the solvent, while simultaneously removing the ink from the surface of the protruding features such that substantially no ink remains on the surface of the protruding features), providing a second substrate and contacting the surface of the protruding feature with the surface of the second substrate (page 1, paragraph 8) to transfer ink from the edge of the protruding features to the surface of the substrate (see Fig. 1A). The surface of the substrate must necessarily have a higher affinity to ink than the surface of the stamp for printing to take place.

Adams et al. does not explicitly teach the provision of a barrier layer covering the contact surface and the edge on the protruding feature and the bulk surface. However, Adams et al. does teach that the material of the stamp surface and the choice of solvent and molecular ink act in such a way as to prevent the majority of the solvent from entering the stamp and in this way functions similarly to a barrier layer (see paragraph 8, and paragraph 25, the preference to ethanol solvent with a PDMS stamp). Cherniavskaya et al. teaches providing a barrier layer, being hydrophobic pads and particularly, a PDMS surface structure that is enhanced with optimized solution chemistry for being hydrophobic and further resisting swelling (see page 7033, the second full paragraph of the second column, enhanced hydrophobic surface structure would be a barrier layer, the barrier layer to be the entire surface of the stamp as swelling of the stamp is undesirable in Adams et al. and analogous Cherniavskaya et al.) covering the contact surface. Since the edge is perpendicular to the contact surface, the barrier layer covering the contact surface can also be considered to cover the top of the edge, although it does not necessarily cover the face surface of the edge. By covering the contact surface, the protruding feature and the bulk surface are also covered. It would have been obvious to one of ordinary skill in the art at the time the invention was made to enhance the hydrophobic nature of the PDMS surface for the purpose of improving dewetting and preventing swelling of the PDMS stamp.

The barrier layer of Cherniavskaya et al. prevents molecules of the ink and solvent from penetrating the stamp.

The combination of Adams et al. and Cherniavskaya et al. does not teach the provision of a first substrate with a surface having higher affinity for the ink than the barrier, contacting the contact surface of the protruding feature with the first substrate, transferring all of the ink from the contact surface of the first substrate and removing the stamp from the surface of the first substrate such that none of the ink remains on the contact surface of the protruding feature of the stamp. However, Schueller et al. teaches in a micro-contacting printing of a stamp on a substrate that after ink has been applied to the surface of a stamp, the ink is dried by use of gas jets, in other words, blow drying, or instead, absorbent material may be pressed into contact with the stamp to dry it (paragraph 51). This drying by pressing to absorbent material would involve the steps of providing a first substrate having a higher affinity to ink than the barrier layer, contacting the contact surface of the protruding feature with the surface of the first substrate, transferring ink from the contact surface of the protruding feature to the surface of the first substrate and removing the elastomeric stamp from the surface of the first substrate.

It would have been obvious to one of ordinary skill in the art at the time the invention to use an absorbent substrate to wipe the ink off of the surface of the protruding feature as an equivalent to drying the stamp with gas jets to remove all of the ink from the surface of the protruding feature for the purpose of producing a cleaner stamped image. The transfer of all of the ink from the contact surface of the protruding feature comes from the teaching in Adams et al. (paragraph 8), referenced earlier in the rejection to this claim.

For claim 2: The combination of Adams et al, Cherniavskaya et al. and Schueller et al. teaches the method of claim 1. Schueller et al. teaches further the act of removing a part of the surface of the second substrate (paragraph 59, post processing comprising etching), the part being defined by the ink pattern (paragraph 74, etching occurs in portions not protected by SAMs). It would have been obvious to one of ordinary skill in the art at the time the invention was made to subject the printed substrate to post processing involving etching to produce a finished circuit of the appropriate size and having imprinted features of an appropriate depth.

For claim 3: The combination of Adams et al., Cherniavskaya et al. and Schueller et al. teaches the method of claim 2 and Schueller et al. further teaches that the removing step comprises etching (paragraph 59).

For claim 4: The combination of Adams et al., Cherniavskaya et al. and Schueller et al. teaches the method of claim 1 and Adams et al. teaches that the act of providing the surface of the second substrate is performed for a period of time to allow lateral movement over the surface of the second substrate of the ink transferred by the edge (see Fig. 1A of Adams, the ink is transferred from the stamp to the substrate, and has some lateral width on the substrate; since all of the ink is initially on the stamp, there is at least some lateral movement of this ink and since movement cannot occur instantaneously, there is some time frame connected with this movement).

For claim 5: The combination of Adams et al., Cherniavskaya et al. and Schueller et al. teaches the method of claim 1 and Adams et al. further teaches

removing solvent from the contact surface (see paragraph 8, blow drying removes the solvent from the contact surface, which in combination also has the barrier layer).

For claim 6: The combination of Adams et al., Chernivaskaya et al., and Schueller et al. teaches all of the method of claim 1 wherein Adams et al. teaches that an increase in contact time between the contact surface of the protruding feature and the surface of the second substrate results in the transfer of an increasing fraction of the ink from the edges to the surface of the second substrate (see Adams et al., paragraph 36, contact time may affect line width which is directly related to amount of ink transferred).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID BANH whose telephone number is (571)270-3851. The examiner can normally be reached on M-F 9:30AM - 8PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on (571)272-2258. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DHB

/Leslie J. Evanisko/
Primary Examiner, Art Unit 2854